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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/883,693	06/18/2001	Keith S. Manson		1058
7590	08/17/2005			
Leo J. Aubel 111 Rivershire Lane Lincolnshire, IL 60069				
			EXAMINER SPOONER, LAMONT M	
			ART UNIT 2654	PAPER NUMBER

DATE MAILED: 08/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/883,693

Applicant(s)

MANSON, KEITH S.

Examiner

Lamont M. Spooner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2001.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-11 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/18/01.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1-8 are objected to because of the following informalities:
 - In claim 1, page 38, line 6, "sequence pf sequences" should probably be - - sequence of sequences", line 20 "determining the proper dependencies" should probably be - - determining proper dependencies- -, to avoid antecedent issues, line 23, "each processed expression" has antecedent issues, line 4, "processed expressions" have antecedent issues, page 39, lines 1 and 2, "to represent the formal syntactic structure" should probably be - - to represent formal syntactic structures- - , to avoid antecedent issues, line 15, "in an internal in an internal" should probably be - - in an internal".
 - In claim 2, page 40, lines 9, and 10, "said processed expressions" has antecedent issues, line 11, "said processed expressions" has antecedent issues, line 12, "the semantic algebra" has antecedent issues, line 13, "the semantic algebra" has antecedent issues.
 - In claim 3, page 41, line 2, "said system" has antecedent issues, line 16, "representing the syntactic" should probably be - -representing syntactic- -, to avoid antecedent issues, page 42, line 8, "objects in the semantic algebra" has antecedent issues.

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- In claim 4, page 43 line 4, "representing the syntactic" should probably be - -representing syntactic- -, line 18, "the semantic tensor algebra" has antecedent issues, line 22, "l)" should probably be - - m) - -.
- In claim 5, page 44, line 15, "representing the syntactic" should probably be - -representing syntactic- -, page 45, line 2, "the semantic algebra" has antecedent issues, line 5, "in the semantic tensor algebra" has antecedent issues.
- In claim 6, page 45, line 1, "the output" has antecedent issues.
- In claims 7, and 8, the alphabetical bullets or indexes have antecedent issues with regard to their parent claims.

The Examiner requests the applicant to further check the claims for similar issues. The Examiner has interpreted the claims as best understood, for purposes of expediting prosecution.

- Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heidorn et al (Heidorn, US 5,966,686) in view of Warren et al. (Using Semantics in Non-

Context-Free Parsing of Montague Grammar, 1982) and further in view of Ramaswamy et al. (Ramaswamy, US 6,311,150).

As per **claim 1**, Heidorn teaches a natural language processing apparatus for translating natural language into a formal language executable on a programmable device, said system comprising,

- a) memory for storing data, (c.8.lines 1-9);
- b) a data processor (ibid);
- c) an input device for presenting natural language text to said system (ibid, "NLP" natural language processing, c.8.lines 14, 15);
- d) a text parser for partitioning said text into a sequence of sequences of string of characters or pretokens (c.8.lines 15-20, his "each word");
- e) a lexicon for storing lexical terms as token associated with lexical type and reference data (ibid, his records for each word (c.8.lines 17-20, his electronic dictionary and morphological subsystem, c.3.lines 36-40);
- f) a lexical type assignment process for assigning lexical types to pretokens by comparison to terms in the lexicon (ibid, his records for each word, Fig 27-his information types associated with the pretokens, c.3.lines 36-40);
- g) a lexical insertion processor for inserting terms into the lexicon under specific control (c.8.line 65-c.9.line 9 and c.9.lines 19-21);
- i) a type contextualization processor by which refined lexical types may be reassigned to tokens depending on syntactic context (c.14.lines 20-27, Fig 44-his "whom" which is reassigned due to context);

Heidorn does not explicitly teach step h), wherein ... a control processor for invoking lexical insertions under the condition that a pretoken is not recognized as a lexical token.

However, the Examiner takes Official Notice that having a control processor for invoking lexical insertions under the condition that a pretoken is not recognized as a lexical token was well known in the art at the time of the invention. Therefore, it would have been obvious to modify Heidorn by inserting lexical items that aren't recognized as tokens. The motivation for doing so would have been to add words to a dictionary that aren't recognized.

Heidorn further lacks j)-m), and the syntactic and semantic algebraic functions, n)-t).

However, Warren teaches:

j) a type reduction matrix (page 134 c.1 para. 5-c.2 para 2);

k) a term reduction processor which uses said type reduction matrix to determine proper syntactic dependencies between tokens in a sentence (page 134, c.1 para. 4-c.2 para 2, including his reduction and prenex normal form with the matrix...);

l) a term inversion processor for constructing chains of syntactic dependencies among lexical terms in an expression and for determining the proper dependencies between those chains (ibid, wherein the ordering of the literals in the clauses of the matrix is defined and interpreted as the term inversion);

m) a syntactic tree generation processor for constructing syntactic trees representing the syntactic structure of each processed expression (page 134, c.2 para. 2);

n) a syntactic algebra comprising syntactic terms formally representing processed expressions (p.136 , c.2, especially para 2, the syntactic algebra necessarily comprising syntactic terms, page 137, c.2);

o) a syntactic representation processor for constructing syntactic terms to represent the formal syntactic structure of processed expressions (ibid, his omega representing disambiguated language, page 134, c.2 para. 5);

p) a semantic algebra comprising semantic objects as formal references of appropriate terms in the syntactic algebra (page 137, c.1. para. 5-c.2.para 1 and para 2, the Examiners position is the semantic algebra which requires (using formal references to terms in the syntactic algebra) syntactic information (in the present case syntactic algebra), in order to derive a meaning, interpretation or semantic algebra).

q) a semantic representation processor for associating internal semantic object references with terms in the syntactic algebra (ibid, The Examiners position is the information within the semantic algebra comprises objects-meanings-associated with terms, this is necessary in deriving a meaning from a term, as in determining the meaning of a sentence comprising terms, in the instant application, algebraically);

r) a semantic tensor algebra comprising correlated pairs of syntactic algebraic terms and their semantic object representations (ibid, the language "L" which comprises syntactic algebraic terms as discussed above, and the semantic interpretations

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including a set of meanings “B”, have a semantic tensor algebra which correlates these pairs of information, in the homomorphism which results in the interpretation, which the Examiner concludes as the semantic tensor algebra);

s) a formal representation processor for associating appropriate internal formal models (ibid, his internally constructed formulas, interpreted as models) with terms in the semantic tensor algebra (ibid, and page 134 para 2-by the steps above, the internal models and semantic tensor algebra are associated);

t) a formal interpretation processor for transforming terms in the syntactic algebra into equivalent expressions in an internal formal language (page 137, c.2 para 3, his generated parses to syntactic algebra and taking of their images under the interpretation homomorphism, done internally);

Therefore, it would have been obvious to modify what Heidorn makes obvious with Warren by having a term disambiguation process including a syntactic and semantic algebra for disambiguating natural language input. The motivation for doing so would have been to (p.123) determine “appropriate interaction of syntax and semantics during sentence analysis” with “fully formalized syntax and semantics”, thus providing “a complete, well-defined context” of natural language input.

The combination of Heidorn and Warren do not disclose the external applications, u) and v), as taught by Ramaswamy below.

Ramaswamy et al. teaches:

u) an external representation processor for associating external operational environments with internal formal models (c.5.lines 13-17) ;

v) an external interpretation processor for translating expressions in an internal formal language into equivalent formal expressions executable into appropriate external operational environments (c.5.lines 16, 17).

Therefore, it would have been obvious to modify what Heidorn and Warren makes obvious with Ramaswamy by applying their natural language understanding methods and results to an external environment. The motivation for doing so would have been to translate a natural language input into a formal language suitable for execution, thereby allowing a program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform the natural language input (c.1.lines 40-46).

As per **claim 2**, claim 2 sets forth limitations a)-f), h)-~~m~~^h, n)-~~p~~^{p (SECOND OCCURRENCE)}, similar to claim 1, and are rejected for the same reasons

Heidorn further teaches:

g) correlating terms occurring in a set of expressions in order to replace indirect references by appropriate direct references (c.9.lines 60-64, c.10.lines 9-21, his identification and resolving of "long distance attachment phenomena...", is interpreted by the Examiner as taking the indirect references or anaphoric information, and replacing them with a solid, or "modified parse" or direct references)

but lacks m).

However Warren teaches:

m) combining objects in the semantic algebra by means of a semantic product on pairs of semantic objects to form more complex semantic objects (page 137; para 2-his

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construction of B from the semantic categories, and further "multiple construction sequences" evolved from his interpretations, under the pairs of "g (and f)", which "construct inductively members of "B"). Therefore, it would have been obvious to modify what Heidorn makes obvious with Warren and Ramaswamy by providing more complex semantic objects. The motivation for doing so would have been to extensionalize the results of the semantic algebra (page 137 para. 3).

As per **claims 3-5**, claims 3-5 set forth limitations, similar to claim 2, and are rejected for the same reasons.

As per **claim 6**, Ramaswamy further teaches including a protocol for connecting the output of said translating processor to digitally responsive machines and other data responsive devices (Fig. 1 items 14 and 16).

As per **claims 7-9**, claims 7-9 set forth limitations similar to claims 5, and fall within the scope of the invention, and are thus rejected for the same reasons and under the same rationale, wherein the Examiner has interpreted the formal models to have been constructed in part based on semantic tensor algebra, and the syntactic algebra, as rejected above, are transformed into equivalent expressions in an internal formal language.

Claims 10 and 11, fall entirely within the scope of the invention, and set forth limitations similar to claims 1-5, and thus are rejected for the same reasons and under the same rationale.

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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- Pereira, Categorical Semantics and Scoping (1990) Computations Linguistics V.1, p.1-10 teaches syntactic to semantic algebra of input natural language for disambiguation into a formal language.
- Uchinami et al., Linguistic model based on the generative topological information space, Osaka University (1980), p.93-100, teaches semantic and syntactical relations in algebraic forms and mappings.
- Ho (US 5,884,302) teaches natural language processing for translating natural language into a formal language executable on a programmable device.
- Namba et al. (US 5,555,169) teaches natural language processing for translating natural language into a formal language executable on a programmable device.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lamont M. Spooner whose telephone number is 571/272-7613. The examiner can normally be reached on 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on 571/272-7602. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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7/8/05

Donald L. Storm
PATENT EXAMINER
AU 2654